APPENDIX 11B
SECONDARY CONTAINMENT CALCULATIONS FOR

- PROCESS TRAILER
- SURGE TANKS
- REAGENT STORAGE TANKS
- UNPACK AREA

1. PROCESS TRAILER SECONDARY CONTAINMENT CALCULATIONS

The net volume of the process trailer secondary containment system is the gross volume minus the volume displaced by support structures and piping.

The net volume is calculated as follows:

1. Gross volume of secondary containment system is the volume of the underpan plus the volume of the sump:

   V gross underpan = 9 feet wide by 34 feet long by 0.42 feet high = 129 cubic feet = 965 gallons

   V gross sump = 0.82 feet wide by 2 feet long by 1.5 feet deep = 2.5 cubic feet = 19 gallons

   V gross total = 965 + 19 = 984 gallons

2. Volume displaced by floor support structures and piping is conservatively estimated to be approximately 40 percent of the containment volume.

   V displaced = 394 gallons

3. The net volume of the secondary containment system is the gross volume minus the volume displaced.

   V net = V gross - V displaced
   V net = 984 gallons - 394 gallons = 590 gallons.

Required volume for liquid secondary containment is 100 percent of the largest vessel in the process trailer. The three process vessels in the process trailer have capacities of 500, 208, and 24 gallons.

Thus, 500 gallons is the secondary containment requirement for liquids. As shown in items 1 through 3 above, the secondary containment system for liquids provides sufficient capacity to contain 590 gallons of liquids within the process trailer.

2. SURGE TANKS SECONDARY CONTAINMENT CALCULATION

Secondary containment for the surge tanks is provided by a containment pan surrounding the skid supporting the tanks. This 10 foot by 8 foot by 0.5 foot containment pan has a gross volume of 299 gallons. Each surge tank has a capacity of 275 gallons and is operated at this volume. As indicated below, the containment pan is of sufficient capacity to contain 100 percent of the volume of the largest tank within the containment.

1. Operational capacity of one surge tank = 275 gallons

2. Volume of secondary containment pan:

   V = 10 feet wide by 8 feet long by 0.5 foot high
   V = 40 cubic feet = 299 gallons

3. Required volume for secondary containment is 100 percent of the largest tank contents (275 gallons).

4. The net volume of the secondary containment pan is the gross volume minus the volume displaced by the surge tank piping and supports:

   V net = V gross - V displaced
   V net = 299 gallons - 4 gallons = 295 gallons.

Therefore, 295 gallons is sufficient for the two 275 gallon surge tanks.

3. REAGENT STORAGE TANKS SECONDARY CONTAINMENT CALCULATION

Secondary containment for the reagent storage tanks is provided by a berm surrounding the skid supporting the tanks. This 10 foot by 8 foot by 0.5 foot skid has a gross volume of 299 gallons. Each reagent storage tank has a capacity of 203 gallons and is operated at this volume. As indicated below, the secondary containment pan is of sufficient capacity to contain 100 percent of the volume of the largest tank within the containment.

1. Operational capacity of one reagent storage tank = 203 gallons

2. Volume of secondary containment pan:

   V = 10 feet wide by 8 feet long by 0.5 foot high
   V = 40 cubic feet = 299 gallons

3. Required volume for secondary containment is 100 percent of all containers' contents (203 gallons).

4. The net volume of the secondary containment pan is the gross volume minus the volume displaced by the reagent storage tank piping and supports.:

   V net = V gross - V displaced
   V net = 299 gallons - 6 gallons = 293 gallons.

Therefore, 293 gallons is sufficient for the two 250 gallon reagent storage tanks.

4. UNPACK AREA

Secondary containment for the Unpack Area is provided by the flooring beneath a grated walking platform above the floor. The Unpack Area's secondary containment has a gross volume of 8 feet 8 inches wide by 22 feet 8 inches by 0.083 feet deep. As indicated below, the secondary containment pan is of sufficient capacity to contain 100 percent of the volume of the largest container within the containment or 10 percent of the total volume, whichever is greater.

1. Operational capacity of one waste container = 55 gallons

2. Operational capacity of one 30 gallon waste container, and two 55-gallon waste containers = 140 gallons. Ten percent of 140 gallons = 14 gallons.

3. Volume of secondary containment pan:

   V = 8 foot 8 inches wide by 22 feet 8 inches long by 0.083 foot deep
   V = 16.3 cubic feet = 121 gallons

4. Required volume for secondary containment is 100 percent of the largest containers' contents (55 gallons).

5. The net volume of the secondary containment pan is the gross volume minus the volume displaced by the Unpack Area piping and equipment supports:

   V net = V gross - V displaced
   V net = 121 gallons - 5 gallons = 116 gallons.

Therefore, 116 gallons is sufficient for one 30-gallon waste container, and two 55-gallon waste containers.